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C.B. L'folin Roosa

TINNITUS AURIUM:

A PAPER

READ AT THE

HARVEIAN SOCIETY OF LONDON,

APRIL 15th, 1875.

BY

GEORGE P. FIELD, M.R.C.S.,

*Aural Surgeon to St. Mary's Hospital, and Lecturer on Aural
Surgery in the Medical School.*



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P R E F A C E.

THIS Paper was read before the Harveian Society on the 15th of April. An interesting discussion followed, in which the President, Dr. Broadbent, and other Members took part.

As the subject was one of some importance, it was then suggested that the Paper should be published.

It was also discussed at the next Meeting of the Society, May 6th, when a Member who had been present at the reading of the Paper stated that he had treated two patients successfully by the means I had adopted, but that he had found in other cases great pain and sometimes hæmorrhage resulting from the treatment. This must have been caused, I think, by applying the current stronger than is necessary, for I have never myself seen anything of the kind as a sequence of Faradisation carefully applied to the membrana tympani, although I have

treated a great number of patients in this way during the last six months, both in Hospital and in private practice. It is gratifying to find, however, that others have carried out my suggestion successfully. The President at this Meeting again requested that my Paper should be published: I therefore present it, however imperfect it may be, to my professional brethren.

GEORGE P. FIELD.

LOWER SEYMOUR STREET,
PORTMAN SQUARE.

TINNITUS AURIUM.

MR. PRESIDENT AND GENTLEMEN,

I HAVE been asked to read a paper this evening on some form of disease of the ear.

In an unguarded moment I made a promise to do so, forgetting at the time how much aural catarrh and curable kinds of deafness, &c., you have had lately brought before you (both in this and last Session), so ably given and so patiently listened to.

The ground seemed thus to be cut away from under my feet, and I fancied members saying to themselves—"Another paper on the ear—this is too much of a good thing." However, good or bad, I must ask you to listen to what I have to say on the subject I have chosen, viz., tinnitus aurium; or, singing in the ears.

This, as you are aware, is very frequently met with, is common to nearly all aural diseases, and is often a symptom of a most distressing kind.

I purpose this evening to give you, in the first place, the causes of tinnitus aurium; secondly, the

various remedies and treatment that have been proposed ; and, thirdly, I shall give you some interesting cases that have occurred in my own practice, with the means I have adopted for their relief or cure.

I can imagine nothing more painful, nothing harder to bear, than a continual noise in the ears, such as some unfortunate patients describe. The shriek of a railway whistle is never a particularly delightful sound, but to be obliged always to listen to it, whether we like it or not, must surely be horrible in the extreme ; or take, for instance, a noise which is also very commonly described, and with these patients I am sure you will sympathise, I allude to ringing of bells. We most of us have experienced that peculiar and unpleasant feeling which comes over us when we hear the night bell, especially if it rings, as it always does, on a cold or wet night. That is surely bad enough, but to hear that wretched bell never ceasing, with half a dozen others of a more musical tone, with perhaps the greatest difficulty in hearing anything else, must be past endurance. No wonder then that we occasionally read of cases of suicide from noises in the ears becoming intolerable.

Roosa mentions a case of a professor who consulted him on account of severe tinnitus aurium, who, when he found that he could get no relief from this very trying symptom, said, on leaving the con-

sulting room, that he would put an end to his existence, which he did shortly afterwards by blowing out his brains.

Another instance is recorded, viz., of a public school teacher who was exceedingly depressed from the same cause, and who committed suicide as he was unable to get relief.

Kramer says, also, "I have known an instance of a man, once strong and healthy, who committed suicide to escape from a persistent and loud noise in the ears, which had lasted for many years."

Sauvage records an instance in which a musician was compelled to give up his occupation because he continually heard a second inharmonious note with every note he played. A very similar case—a lady sent to consult me by Dr. Meadows—has come under my own observation.

And now as to the cause; Sir William Wilde says:—"The peculiar character of the tinnitus and the noises to which it is likened, are as variable as sound itself; I think the descriptions which patients give of the noise which they experience depend, to a certain degree, upon their fancy, their graphic powers of explanation, and, not unfrequently, upon their rank in life, or in the position in which they have been placed, and the sounds with which they are most familiar; thus persons from the country draw their similitudes from the objects and noises by which they have been surrounded, as the falling and rushing

of water, the singing of birds, buzzing of bees, and the waving or rustling of trees ; while, on the other hand, persons living in towns, or in the vicinity of machinery or manufactures, say that they hear the rolling of carriages, hammering, and the various noises caused by steam engines. Servants almost invariably add to their other complaints that they suffer from the ' ringing of bells ' in their ears. The tidal sound, or that which we can produce by holding a shell to the ear, is, however, most frequently complained of. Removing the cause and curing the deafness will often, but not always, relieve the patient of the noise. It is often caused by cerebral disease ; it is sometimes an accompaniment of derangement of the circulatory, digestive, or uterine organs ; of congestion of the brain, hæmorrhage, hypochondria, hysteria, chlorosis, anæmia, typhus, influenza, or simple catarrh ; of closure of the external meatus, obstruction of the Eustachian tube, and impaction of the auditory passage with wax ; a foreign body, or even a hair resting on the tympanic membrane ; as well as engorgement of the lining membrane, or mucous collections in the tympanic cavity ; and also nervous deafness : these will all produce it. So great is the discomfort which it gives, that persons incurably deaf, and who are quite conscious of the impossibility of restoring their hearing, will still apply to be relieved from this haunting and most annoying symptom ; overwork, prolonged suckling, taking

quinine or iron in large quantities, a hearty meal, violent exercise, &c., &c., will often occasion it."

Galen thought that tinnitus aurium was due, in some cases, to exhalations from the stomach, and in others to increased sensitiveness of the ears.

My predecessor at St. Mary's, the late Dr. Peter Allen, writes :—"As chronic catarrh is the commonest form of deafness, so is tinnitus aurium the most frequent result or sign of it. It is dependent upon some abnormal pressure upon the nervous expansion in the labyrinth. The membrana tympani presses the ossicula inwards, and therefore the base of the stapes upon the fluid where the auditory nerve is distributed; or it may be so rigid, tense, and unyielding, that the secretions within the drum press unduly upon the still more delicate membrane of the fenestra rotunda. Thickening and great tension of the lining tympanic membrane do the same thing. When, in a case of aural catarrh, tinnitus and deafness are simultaneous in their commencement, they will increase proportionately; and it is obvious that in this instance both must depend upon some alteration in the conducting apparatus, by which its *acoustic* properties have been interfered with. For example, a little film of mucus spread over the inner side of the membrana tympani, is sufficient to alter the periodicity of its atmospheric vibrations, or even partially to quench them. Thus deafness and tinnitus will co-exist here; but as soon as the removal

or dispersion of the coating from the membrana tympani occurs, both symptoms will together instantaneously vanish. We are amply warranted by facts like these in concluding that the membrana tympani is generally, in some way or another, concerned in causing tinnitus."

"Next in frequency to interference with the membrana tympani, closure of the Eustachian tube is the most common cause of singing in the ears. This also, on analysis, proves to be such, not directly, but in the following manner: a closed tube necessitates a too great curvature inwards of the membrana tympani, and consequently an abnormal pressure upon the nervous expansion within the labyrinth." And this is a most important point to observe.

Hinton also in his supplement to Toynbee's work makes some remarks which I should like to read to you. He says: "When of a beating character and synchronous with the pulse, it is obviously referable to vascular conditions as its exciting cause, and among others sometimes to aneurism of the basilar artery. In some cases, pressure over the course of the carotids immediately beneath the ear temporarily arrests it. In any such case, regard, of course, should be had to the condition of the heart. Some cases, when connected with headache, are said to be dependent on a weakened right side of the heart. Perhaps, however, the most frequent cause of tinnitus is pressure on the labyrinth, as illustrated by the

sound heard on pressing on the *membrana tympani* by a probe. But in estimating the causes of tinnitus it appears to me that the great frequency with which enlargement and fulness of the blood vessels of the labyrinth are found, on dissection, to accompany even slight inflammatory affections of the tympanum, should not be overlooked, and that it may be held probable that any considerable amount of tinnitus seldom exists without somewhat of morbidly increased irritability of the auditory nerve."

In a great many dissections made by Toynbee, Politzer, and others, this diseased condition of the labyrinth has been found; but on the other hand, a case is related by Mr. Dalby, of a man residing at Trieste, "who had suffered for many years from tinnitus of so distressing a character that his life was rendered perfectly wretched. All the best aural surgeons in Germany had been consulted by him without any benefit. According to a request made in his will that his ears should be examined after death, a most careful dissection was made of the temporal bones, but no abnormal appearance of any kind was detected."

I think the mischief can always be traced to the *membrana tympani*. We rarely find tinnitus present in cases of perforation from ulceration, and incising the membrane, no doubt, will afford relief, if a permanent opening can be established; but here everything depends on that little word "if." All kinds

of methods have been suggested to keep open the puncture ; but there is always the utmost difficulty, and oftentimes danger, in succeeding.

Various other remedies have been proposed for this distressing symptom of aural disease. The hydrochlorate of ammonia, 20 grains, three times a-day, is said to be efficacious sometimes ; also glycerine and laudanum, applied warm to the meatus. I have used both these remedies frequently, but have not succeeded in giving relief.

An eminent writer in the *Medical Times and Gazette* says :—"In some cases rubbing over the membrana tympani gently for a short time with a camel's hair pencil, moistened with any mild ointment, will—for a while, at least—remove the noise." And again, he says : "If there is any medicine which acts specifically on tinnitus aurium it is arnica." Well, I have dosed many patients with arnica without any good result.

Trequet reports cases cured in a few days by daily injections of the vapour of chloroform into the tympanum.

Kramer again affirms that tinnitus is in all cases due to irritation of the chorda tympani, and not of the acoustic nerve ; and says that the repeated injection through the Eustachian catheter of a drop or two of a solution of strichnine—one grain to the ounce of water—will generally cure it.

In Holmes' "System of Surgery," the author of

the paper on the Ear says:—"Of all medicines, a combination of quinine and morphia in small doses, taken perseveringly once or twice a-day, seems the most useful. Stimulating liniments around the ears, perhaps containing chloroform, if tinnitus is a prominent symptom, are at least unobjectionable; and the free use of cold water and friction may in most cases be advised. I have never known any benefit produced by strychnia."

Bromide of ammonium, bromide of potassium, ergot, digitalis, have all been recommended. Other more extraordinary measures have been suggested. One of my patients at St. Mary's recommended me to try a bit of a dead eel put in the ear as a capital thing for buzzing in the ears.

Well, all these modes of treatment may do good in some instances; but the treatment which I have rarely found to fail is Faradisation. Of course I do not mean to assert that if a patient has noises from wax in the ear you must treat him in this way. Many cases of tinnitus, from debility, chlorosis, &c., may very often be cured by tonics, such as preparations of iron, nux vomica, quinine, &c., &c.

Again, in aural catarrh, judicious treatment by the Politzer bag, the Eustachian catheter, &c., will generally get rid of any troublesome noise.

Whether it be from cerumen, debility, chlorosis, aural catarrh, or from whatever cause the sound is

produced, if treatment adapted to the nature of the complaint is carried out, we shall often be able to cure the patient. But in the following cases a variety of remedies had been invariably adopted, with little or no benefit before the battery was used.

In point of fact I have no hesitation in saying that Faradisation applied directly to the tympanic membrane, will either materially relieve the patient from the noise he has been suffering from, or stop it altogether.

Dr. Althaus, in his "Medical Electricity," says:—"All forms of electricity are able to rouse the vital energy of the auditory nerve, which responds to the stimulus by sounds. I have always found the sound produced to be as near as possible to the note A.

"Dr. Brenner, of St. Petersburg, has made a most extensive series of researches on the action of electricity on the auditory nerve. According to him, the induced current is almost useless for experiments of this kind, because the rapidity with which the shocks succeed each other, produces very unpleasant effects on the nerves of common sensation, without acting on the nerve of special sense. A specific response of the auditory nerve may nevertheless be obtained, but only by single closing or opening shocks from the induction apparatus, the opening shocks being the more effective ones. Some people perceive, when the power of the current is increased, a regular scale of auditive sensations, proceeding from humming

to hissing, rolling, whistling, ringing, &c., and who hear sounds with low power, but tones with high power.

"Brenner's publications have given rise to an animated discussion, which was commenced by Dr. Schwartz, who pronounced Brenner's statements to be altogether erroneous, and utterly devoid of value in a diagnostic, prognostic, and therapeutical point of view. He was answered by Dr. Hagen, of Leipzig, who confirmed Brenner's statements in almost every particular; and by Brenner himself, who contended that Schwartz's experiments of control had been made without any regard to the mode of experimentation recommended by himself, and were therefore worthless.

"A single shock from an induction apparatus produces a noise like a scratch; if the currents succeed each other rapidly, the noises do so likewise, and then resemble the buzzing of a fly on the window, or the blowing of a distant trumpet. At the same time a sensation of pricking and pain is perceived, if the current be of high tension. The negative pole is more effective in the production of the acoustic phenomena than the positive."

Dr. Brenner, of course, in what I have just read to you, is speaking of the benefit derived from galvanism in nerve deafness. I am not going to discuss that subject this evening, but I agree with him in thinking that the continuous current is more

likely to be of permanent service to the patient in this disease, than the use of the induction apparatus. But with reference to electricity as a remedy for severe noises in the ear, I maintain that the good effect I have obtained is due to the stimulation of the intrinsic muscles of the ear, but I shall go more fully into this presently. And this stimulation, it seems to me, is carried on better with Faradisation than with galvanism. I cannot, however, say that I have had much experience with the latter. But I hope shortly to bring before the Society the results of some experiments I am making with regard to the efficacy of the continuous current in this form of disease, viz., severe tinnitus aurium. I must, however allow, that I can hardly hope to have better success with the continuous than I have had with the induced current. It seems to me that Faradisation is more easily applied. I use Dr. Stöhrer's double-celled induction apparatus, and pass the current directly on to the membrana tympani, by means of a vulcanite speculum, with a piece of platinum wire passed through it, and which is attached to one of the wires of the battery. A silver probe brought into contact with the platinum is then used to carry on the current from the speculum to the tympanic membrane. This instrument is made by Messrs. Krohne and Seseman, of Duke Street. At first it is necessary to apply a very weak current, which may be gradually increased in strength. Of course

there will be pain experienced, but it is very slight if the shock is conveyed in the manner I have just mentioned. I have never, in a single case, had any hæmorrhage, acute pain, or any serious result from the application in this way.

“The production of the peculiar sensation of taste, which is caused by Faradisation of the drum of the ear, is due to stimulation of the trunk of the chorda tympani, which, after having emerged from the cavity of the tympanum through the fissura Glaserii, descends towards the gustatory nerve, in the sheath of which it enters, and then proceeds towards the tongue. Faradisation of the membrana tympani likewise produces contractions of the muscles of the tympanum.”

And this is the point I want you specially to notice; for as I have said before, I attribute the benefit derived in tinnitus aurium entirely to stimulation of these muscles, just as in other parts of the body paralysis is often overcome by the same means.

The first case that I shall bring before you is that of M. M., æt. 38, who came to consult me at the Hospital, and who has been suffering from very severe noises in the ears for two years. It is almost unbearable at times. Both membranes look unhealthy, dusky in colour, and concave; there is also obstruction of both Eustachian tubes. The Politzer bag is of no use, and the catheter does not relieve the noise in her ears, although it improves her hearing.

Has two distinct sounds, which she describes, one like a steam engine blowing, and the other a singing noise like a kettle boiling. Hears my watch ten inches right ear, one yard left. Tuning fork is heard best on right side.

I then used Dr. Stöhrer's double-celled apparatus, and after a short time she said, the engine noise does not seem so thick, and now it is more like a hissing. I went on with the Faradisation until the blowing noise stopped altogether, her hearing also improved very much ; the other singing sound continued.

On my next hospital day she came again and said she was much better. I repeated the Faradisation, her hearing improved to one yard right, two yards left.

The next day (Feb. 24) she came to my house ; I then applied the current to the membrana tympani by means of a probe passed through a speculum made for the purpose. Here the effect was much more marked ; for a few seconds the second sound (that is the singing noise) entirely stopped in whichever ear I applied the battery. A noise afterwards returned, but quite a different sound to what she had ever had before, and she exclaimed, "My head seems quite clear, and the noise is like a faint hurdy-gurdy, delightful compared to the other." She complained of a peculiar taste in her mouth, and said that the sensation in her ear was like pricking and scratching the drum of her ear with a pin. Her hearing improved two yards left, one and a half right.

Next day the hurdy-gurdy sound still remains, but she says that after she had seen me yesterday the noise went away two or three times altogether, and it seemed quite strange to be without it; formerly she could not sleep at night for the noise, but now gets perfect rest.

Feb. 26. Noise fainter, goes away at times, head much clearer.

Feb. 27. Still better, says that the hurdy-gurdy now sounds a long way off, and is getting fainter every day.

Feb. 28. I used the battery only to the membrane of the worst side, the right.

March 1. Says that since yesterday the hurdy-gurdy sound has gone altogether from the right ear, but on the other side, in which I did not apply the current, she still hears the same sound very faintly. She also said, "When I got up in the morning, I had to listen some time before I could make out the noise. It is a very long way off, and does not trouble me in the least."

March 5. Hurdy-gurdy noise gone, but has very slight blowing noise again in right ear, which went away after Faradisation.

March 15. Gradually improving, but occasionally hears a slight noise, but always a very long way off.

I may here mention that in a great many patients who have consulted me for singing in the ears, I have failed to observe any abnormal condition of the membrana tympani, and yet the noises were as loud and

distressing as in the others, and they yielded as readily to Faradisation.

The next case is that of A. F., æt. 24 : has been deaf 14 years, with constant noise in her ears, which she says is like a steamer on the water, is very horrid, and so bad that she dreads to go to bed. Hears watch 2 inches right side, 3 inches left ; tuning fork best in left. Here there was on both sides great concavity of membranes, with partial closure of Eustachian tubes, and fluid in tympanum. Faradisation was of great service ; I applied it daily for a week. The steamer stopped, and has never gone on again. I saw her two months afterwards, and she has never had any return of the noise. I saw her last Tuesday, and she said, " I am now quite free from noise of any kind."

Mr. M., 28, who has suffered from chronic aural catarrh for 8 years, with deafness and severe tinnitus aurium, brought on from swimming under water ; has unnatural concavity of both membranes, and when he first consulted me both Eustachian tubes were impervious. I constantly passed the Eustachian catheter ; this treatment had a very beneficial effect on his hearing, but the noise remained.

Describes a sound "like a railway whistle heard coming into a station from a tunnel ;" another sound like blowing in a bottle, and both noises are constantly going on.

After Faradisation the whistle sound remained the same, but the blowing almost stopped.

The noises got less every time I used the battery. In fact the treatment was so successful that he bought a battery for himself, and I saw no more of him.

Next case is that of a lady who has been deaf for 20 years, with a noise, which has never ceased, like the roaring of the sea. There is nothing remarkable to observe about her case. I see her once a week, she is steadily improving, the effect of Faradisation; the noise is much less, and leaves her altogether at times. She fancies her hearing is also better, but I cannot see much improvement myself in that respect. She, however, assures me that she is no longer troubled by tinnitus aurium.

J. E., October 14, came to the hospital February 22: is very deaf and very stupid; cannot hear watch on contact; has suffered from deafness for 10 years; membranes concave, dark in colour and look unhealthy. Says he suffers always from a row, but cannot describe what the noise is like—says it is a loud row. Under the same treatment the sound became much less, his hearing also improved, and the last time I saw him he appeared very delighted, and said the row has almost gone.

The next patient, E. O., deafness 14 years, with constant severe tinnitus aurium like singing of a kettle and ringing of bells; both membranes of a

dark grey colour; Eustachian tubes in healthy condition; hears watch 5 inches left, 4 right; tuning fork best on right side. I treated this patient for a considerable time, but although her hearing improved, the noise remained the same. I then applied the battery to the membrana tympani on both sides, and after a short time the sounds on both sides stopped for two or three minutes, and when they returned she said they are "far off."

I used the battery five times; both noises have entirely ceased, and she has had no return of them.

Mr. R., chronic catarrh five years, deafness, and noise which he describes "like Pickford's van filled with iron bars going over the stones." This gentleman was quite cured after a short time by Faradisation.

Mr. A., sent to consult me by Dr. Sibson, says he has had a "constant puffing" for five years, which left him entirely after Faradisation.

Mr. C. came to consult me, March 18th, with deafness and severe tinnitus aurium. Says that at times the noise in his ears is most distressing, but varies, sometimes like one noise, sometimes like another, but the steam engine sound gives him most trouble. Has been suffering from chronic aural catarrh for five years, with all the usual symptoms; with great concavity of both tympanic membranes. I saw this gentleman six times, March 18th, 20th, 25th, 31st, and April 5th and 10th. - The noise has

steadily decreased, and gets fainter every day. His hearing distance when he came to me was 1 inch right ear, contact left; and when I last saw him on the 10th of this month it was 20 inches right, 18 inches left. He is still going on with the treatment.

In the next cases various noises are described. In H. B. the sound is like a "noise heard in a stone-yard;" E. W., "hammering on something hollow, like an iron foundry;" M. C., like "meeting a lot of trains on the underground railway;" R. B., noise like "being in a forest, the wind blowing very hard through the trees;" J. L., "a hissing;" E. P., like the "swarming of bees;" S. B., like "knocking of basins together;" J. B., like "a fly buzzing in the ear." All these have greatly benefited from the same treatment, and many of them apparently cured.

I have numerous cases of the same kind which I could bring before you, but I think I have said enough to show that the treatment by Faradisation does, in some way or another (in some cases at any rate), prove of the utmost benefit to the patient.

When our greatest authority in this country says that "it seems better that the causes of tinnitus should be held as yet a very open question," it is not for me to lay down the law on the subject.

But I certainly think that we may in part account for the benefit derived. Faradisation, no doubt, stimulates the intrinsic muscles of the ear, and

therefore enables them to perform their function. I have reason to believe that the stapes often remains fixed within the foramen ovale in these cases of tinnitus.

Such a condition doubtless does, from the continued pressure of the stapes on the internal ear, induce a constant formation of false sounds. The partial withdrawal of the stapes, effected by contraction of the stapedius muscle, would be followed by a reduction, or a temporary removal of such false sound; and I would therefore suggest that if this stimulation is carried on perseveringly, the muscle may regain its tone and exert its proper influence in the auditory function.

I merely give you the result of my experiments, and you can take them for what they are worth. Possibly the next series of experiments I make with the continuous current, may have a still better effect in stimulating the intrinsic muscles of the ear, but I can scarcely hope to do more by that means than I have already succeeded in doing, viz., relieving, and in some cases curing, severe singing in the ears.

I shall be glad to hear what other gentlemen may have to say on the subject, and, in conclusion, I hope you will overlook any shortcomings that you may have noticed. My excuse must be—first, the limited time I have had for preparation; secondly, to discuss thoroughly this important subject must

require necessarily a much longer period of time than that I have had at my disposal this evening.

On the other hand, the kindness and courtesy which members of the Harveian Society invariably show to those who strive to do their best, must always help one materially in reading a paper here. This patience and kind attention you have bestowed on me this evening, and I thank you for it.

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